

PATENT ABSTRACTS OF JAPAN

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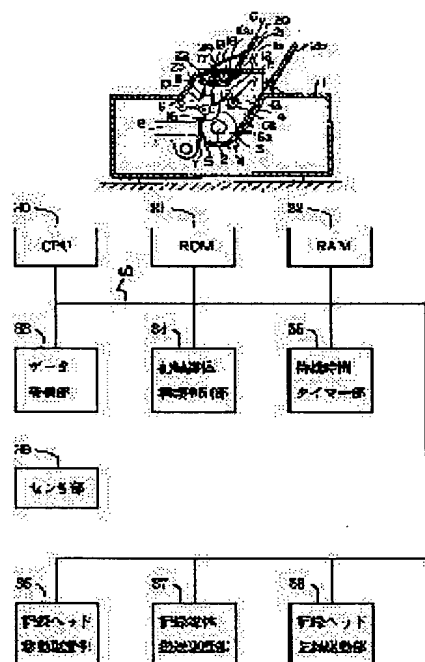
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(54) INK-JET RECORDER

(57)Abstract:

PURPOSE: To make it possible to prevent contamination and offset caused by ink by providing a means, which can vary the standby time before the start of the back surface recording after the end of the front surface recording of a recording medium in double-surface recording in response to the kind of the recording medium.

CONSTITUTION: When the recording for one page is finished, a recording medium 6 is discharged. When the recording operation is made for one-surface recording, the recording medium 6 is discharged on a paper tray 20. For the double-surface recording, the medium is set at a sucking position for back-surface recording. When the recording medium 6 is set at the sucking position for the back-surface recording, the recording is made to wait for the specified time before the start of the back-surface recording. For the standby time, the standby time corresponding to the preset kind of the recording medium 6 is set in the timer of a CPU30. The waiting is performed by driving a timer 35. After the elapse of the preset time of the timer, the recording medium 6 is sucked, the recording data are received from a host computer by the same way as the operation in front-surface recording and the recording is performed for every one line. After the recording of one page is finished, the recording medium 6 is discharged, and the front-surface recording and the back-surface recording are completed.



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CLAIMS

[Claim(s)]

[Claim 1] An ink jet recording device characterized by having an ink jet record means which records by breathing out ink according to a signal, a conveyance means to convey a record medium at the time of one side and double-sided record, and a means which carries out adjustable [of the standby time before an after / surface record termination / rear-face recording start of a record medium at the time of double-sided record] according to a class of said record medium.

[Claim 2] An ink jet recording device characterized by having a means which carries out adjustable [of an ink jet record means which records by breathing out ink according to a signal, a conveyance means to convey a record medium at the time of one side and double-sided record, and record concentration at the time of one side record and record concentration at the time of double-sided record].

[Claim 3] Said ink jet record means is an ink jet recording device according to claim 1 or 2 characterized by having an electric thermal-conversion object for generating heat energy for ink regurgitation.

[Claim 4] Said ink jet record means is an ink jet recording device according to claim 3 characterized by making ink breathe out from a delivery with heat energy impressed with said electric thermal-conversion object using film boiling produced in ink.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001] [Industrial Application] This invention relates to the ink jet recording device which has especially perfecting machine ability about the ink jet recording device which records by breathing out ink according to a signal.

[0002]

[Description of the Prior Art] By driving the dot means forming of a recording head based on a record signal, recording devices, such as a printer and facsimile, are constituted so that the dot pattern corresponding to said signal (image information) may be formed on the record medium (usually record sheet).

[0003] Although there is a recording device using the ink jet method as one format of said recording device, this makes an ink drop fly according to said signal from a recording head, makes said ink drop adhere to record media, such as a record sheet and plastics sheet metal, and forms an image.

[0004] Conventionally, record was performed, without what has a double-sided record function in said ink jet recording device changing the record concentration at the time of one side record and double-sided record.

[0005] Moreover, the ink on the surface of a record medium on the property which a record medium is made to breathe out an ink drop and forms an alphabetic character or an image, and immediately after record does not dry, but before said ink jet recording device moved to rear-face record, he was trying to prevent the dirt in said ink by establishing a fixed standby time.

[0006]

[Problem(s) to be Solved by the Invention] However, since a difference arose in time amount until ink dries according to the class of record medium etc. even if it establishes a fixed standby time before moving to rear-face record like the above-mentioned conventional example, it might move to rear-face record in the condition that the ink on the surface of a record medium is not dry, and there was a problem that the dirt in the ink etc. was generated. Moreover, it influences a throughput and is not practical if sufficient standby time for corresponding to all record media is established.

[0007] Moreover, since the record concentration at the time of one side record and double-sided record was the same, the so-called reverse side projection of the image on the rear face of a record medium having been transparent on the record-medium surface with the class of record medium etc. at the time of double-sided record, and being reflected might take place, and there was a problem of being hard coming to read the image recorded in that case.

[0008] Then, the purpose of this invention solves said technical problem, and uses as an offer plug the ink jet recording device which prevented dirt and the reverse side projection in ink.

[0009]

[Means for Solving the Problem] The configuration of an ink-jet recording device of this invention for attaining said purpose is characterized by to have an ink-jet record means which records by breathing out ink according to a signal, a conveyance means convey a record medium at the time of one side and double-sided record, and a means which carries out adjustable [of

the standby time before an after / surface record termination / rear-face recording start of a record medium at the time of double-sided record] according to a class of said record medium. [0010] A configuration of an ink jet recording device of this invention for attaining said purpose is characterized by having a means which carries out adjustable [of an ink jet record means which records by breathing out ink according to a signal, a conveyance means to convey a record medium at the time of one side and double-sided record, and record concentration at the time of one side record and record concentration at the time of double-sided record].

[0011]

[Function] If it is in the ink jet recording device concerning said configuration, dirt and the reverse side projection in ink are prevented by carrying out adjustable [of the standby time before moving to rear-face record] according to the class of record medium.

[0012] If it is in the ink jet recording device concerning said configuration, reverse side projection of ink is prevented by carrying out adjustable [of the record concentration at the time of one side record, and the record concentration at the time of double-sided record].

[0013]

[Example]

The [1st example] The ink jet recording device applied to the 1st example of this invention next is explained with reference to a drawing.

[0014] An approximate account is first carried out about the whole ink jet recording device configuration. Drawing 1 is cross-section configuration explanatory drawing of the printer which is one example of the ink jet recording device concerning this invention.

[0015] The platen 3 is supported free [rotation] through the platen shaft 2 by the main part 1 of a printer, and the feed rollers 4 and 5 of a pair are arranged free [rotation] at this platen 3 bottom. The pressure welding of said feed rollers 4 and 5 is always carried out to the peripheral face of said platen 3, and they follow by rotation of a platen 3, and they are constituted so that a record medium 6 may be conveyed in the predetermined direction.

[0016] Moreover, the 1st guide plate 7 sets a platen 3 and a predetermined gap, and is arranged at the front side (left-hand side of drawing 1) of said platen 3. The carrier 8 is equipped with said 1st guide plate 7, and the non-illustrated recording head is carried in this carrier 8.

[0017] This equipment uses the ink jet recording method which breathes out and records ink from said recording head. That is, this recording head is equipped with an energy generation means to generate the drop formation energy made to act on the liquid in the energy operation section prepared in a detailed liquid delivery (orifice), a liquid route, and a part of this liquid route, and this operation section.

[0018] Irradiate electromagnetic waves, such as the record method using electric machine conversion objects, such as a piezo-electric element, and an energy-generation means generate such energy, and laser, make them generate heat, and there is the record method using an energy-generation means heat a liquid and make a liquid breathe out with electric thermal-conversion objects, such as a heater element which has the record method using an energy-generation means make a drop breathe out in the operation by this pyrexia, or an exoergic resistor, etc.

[0019] Since the recording head used for the ink jet record method of making a liquid breathing out with heat energy also in it can arrange the liquid delivery (orifice) for breathing out the drop for record and forming the drop for regurgitation to high density, it can record high resolution. The recording head which used an electric thermal-conversion object as an energy-generation means also in it is easy also for miniaturization, and the advance of technology and the improvement in reliability in the latest semiconductor field can utilize the advantage of remarkable IC technology or micro processing technology more than enough, and high-density-assembly-izing is easy for it, and it is advantageous from a manufacturing cost being cheap. [0020] Moreover, the bail roller 9 is arranged in the front bottom (upper left side of drawing 1) of said platen 3, and this bail roller 9 is constituted by the platen 3 by the non-illustrated driving source possible [a pressure welding (continuous line location of drawing 1), or alienation (dashed line location of drawing 1)]. Moreover, said bail roller 9 has the desirable thing of a stellate configuration, in order to prevent the dirt in ink etc. Furthermore, the 2nd guide plate 10

and the 3rd guide plate 11 are arranged in said bail roller 9 bottom, and it is constituted so that the record medium 6 after the 2nd pass may pass through between said guide plates 10 and 11. [0021] On the other hand, the axis of rotation 13 of the 1st discharge roller 12 is arranged near [the near side (right-hand side of drawing 1) of the 3rd guide plate 11, and on the common tangent which passes along the pressure-welding point of this bail roller 9 and a platen 3 at the time of the pressure welding to the platen 3 of the bail roller 9 if it puts in another way]. Said 1st discharge roller 12 is being fixed to said axis of rotation 13, and said axis of rotation 13 is connected with said platen shaft 2 by the non-illustrated gear, the belt, the friction roller, etc. [0022] Moreover, as shown in details at drawing 2, two or more tooth parts 14 are formed in the 1 side-edge side of the 1st discharge roller 12 every fixed gap at the circumferential direction, this tooth part 14 and after the back end section of a record medium 6 has inserted among 14, it is raised, and it is constituted so that fixed angle rotation may be carried out. Furthermore, the follower roller 15 supported free [rotation on a shaft 16] is carrying out the pressure welding to the peripheral face of the 1st discharge roller 12, and said follower roller 15 is constituted so that it may follow and rotate to rotation of the 1st discharge roller 12. In addition, although said follower roller 15 is not illustrated, it may be a spur roller of a stellate configuration.

[0023] Moreover, the 2nd discharge roller 17 for the time of the 2nd pass is arranged at the upper part side of said 2nd guide plate 10 and the 3rd guide plate 11, and this 2nd discharge roller 17 is being fixed to the axis of rotation 18. Said axis of rotation 18 is connected with the platen shaft 2 by the non-illustrated gear, the belt, the friction roller, etc.

[0024] Moreover, two or more tooth parts 19 are formed in the 1 side-edge side of the 2nd discharge roller 17 as well as said 1st discharge roller 12 every fixed gap at the circumferential direction. Moreover, while bearing 18a is fitted in the axis of rotation 18 of said 2nd discharge roller 17, the periphery of said bearing 18a is equipped with the paper tray 20 free [rotation].

Said paper tray 20 is for loading the record medium 6 after the 2nd pass, and has prevented *** to a near side with the stopper 21. Moreover, the follower roller 22 supported free

[rotation] at the shaft 23 as well as said 1st discharge roller 12 is carrying out the pressure welding also to the peripheral face of said 2nd discharge roller 17, and said follower roller 22 is constituted so that it may follow and rotate to rotation of the 2nd discharge roller 17.

Furthermore, said shaft 23 is equipped with the presser-foot board 24 free [rotation], and **** of the record medium 6 loaded into said paper tray 20 with this presser-foot board 24 is prevented. In addition, a record medium 6 falls, and 25 is a prevention board and is attached in the upper surface of the main part 1 of a printer.

[0025] Next, an operation of the printer constituted as mentioned above is explained with reference to drawing 1 thru/or drawing 6.

[0026] As first shown in drawing 1, it sets so that the surface 6a may become a recording surface about a record medium 6 at the time of the 1st pass. In addition, in case the insertion set of the record medium 6 is carried out, it is made for a carrier 8 to be located in the crosswise center section of a record medium, and is made to send in along with the 1st guide plate 7. Moreover, the bail roller 9 is changed into the condition (continuous line location of drawing 1) that the pressure welding was carried out to the platen 3 by the constant pressure, at this time. And if the rotation drive of the platen 3 is carried out, as shown in drawing 3, the point of a record medium 6 will be led to the plane of composition of a platen 3 and the bail roller 9, and record of an image will be performed by the non-illustrated recording head.

[0027] After record, said record medium 6 is discharged by the tangential direction of a platen 3 and the bail roller 9, and is led to the join of the 1st discharge roller 12 and the follower roller 15. And as shown in drawing 4, it inserts between the tooth part 14 of the 1st discharge roller 12, and 14, fixed angle rotation is raised and carried out by rotation of the 1st discharge roller 12, and the back end section of a record medium 6 is led to insertion opening of a record medium, as shown in drawing 5. At this time, said record medium 6 will be in the condition of having been set so that that rear-face 6b might become a recording surface.

[0028] Next, the bail roller 9 is missed in the continuous line location from the dashed line location on a platen 3, as beforehand shown in drawing 5 at the time of the 2nd pass. Therefore, since the bail roller 9 is in the condition of having been estranged from the platen 3, beforehand

at the time of this 2nd pass, the point of a record medium 6 reaches the join of the 2nd discharge roller 17 for the 2nd pass, and the follower roller 22 through the path which consists of the 2nd guide plate 10 and the 3rd guide plate 11 as shown in drawing 6, after passing through between a platen 3 and the 1st guide plate 7. And after this join passage is stuffed into the paper tray 20 after having been regulated by said presser-foot board 24, and finally, the back end section of a record medium 6 is raised by the tooth part 19 of the 2nd discharge roller 17, and it is loaded into the paper tray 20. In addition, record is performed to rear-face 6b of a record medium 6 at the time of the 2nd pass.

[0029] Next, the control and its actuation at the time of the double-sided record in the printer of said configuration are explained with reference to drawing 7 and drawing 8.

[0030] Drawing 7 is the block diagram showing the electrical circuit of said printer. In drawing 7, the address bus, the data bus, and the bus 40 that consists of a control signal which controls them are outputted from CPU (central processing unit) 30, and the bus 40 is connected to the sensor section 39 which performs home location detection of ROM31, RAM32, the data receive section 33, the record-medium class distinction section 34, the standby-time timer section 35, the recording head migration mechanical component 36, the record-medium conveyance mechanical component 37, the recording head record mechanical component 38, and a recording head, existence detection of a record medium, etc.

[0031] Said CPU30 is controlled by the program built in ROM31. The recording information transmitted from the host computer is received in the data receive section 33 by the side of a printer. The data receive section 33 delivers and receives data according to the condition of a printer, and received data are stored in RAM32. CPU30 controls the recording head migration mechanical component 36, the record-medium conveyance mechanical component 37, and the recording head record mechanical component 38 by the record instruction from a host computer, respectively.

[0032] Drawing 8 is a flow chart which shows the control action of said printer. In drawing 8, if a power supply is supplied to a printer (step S51) and record data is received from a host computer (step S52), a printer inhales a record medium (step S53), and stores the record data for one line in RAM32. And record of one line is performed by the record instruction from 1 line-buffer full or a host computer (step S54). Sequential record is performed for said actuation for every [a repeat and] line (step S55).

[0033] After the record for 1 page (surface record) is completed in step S55, it progresses to step S56 and discharge of a record medium is performed. Here, when said record actuation is one side record, it progresses to step S57, and it is discharged on a paper tray, and when it is double-sided record, said record medium progresses to step S58, and is set to the inhalation location (insertion opening side of a record medium) of rear-face record. If said record medium is set to the inhalation location of rear-face record, before progressing to step S59 and moving to rear-face record, predetermined time standby will be carried out. A setup of said standby time sets to the timer of CPU30 the standby time according to the class of record medium set up beforehand, and is performed by starting a timer. After timer setup-time progresses, it progresses to step S60, a record medium is inhaled and subsequently to step S54 it progresses, and below, like actuation of surface record, record data is received and it records for every line from a host computer. If 1-page record termination is carried out, a record medium will be discharged and surface record and rear-face record will be completed.

[0034] Although the standby time before moving to rear-face record according to the class of record medium is made adjustable in the example mentioned above, it is also possible to make said standby time adjustable with humidity and temperature. Moreover, a user is able to form a switch and to enable it to set up time amount freely.

[0035] The [2nd example] The ink jet recording device applied to the 2nd example of this invention next is explained with reference to a drawing. In addition, since it is the 1st example mentioned above about the whole equipment configuration, and an abbreviation EQC, detailed explanation is omitted and explains only the feature below here.

[0036] The printer as an ink jet recording device concerning this example is constituted so that it can carry out adjustable [of the record concentration at the time of one side record, and the

record concentration at the time of double-sided record]. Hereafter, it explains with reference to a drawing.

[0037] Drawing 9 is a flow chart which shows the flow of actuation of the printer concerning this invention. If the record data from a host computer is received when the power supply of a printer is turned on (step S61) (step S62), the information will judge one side record or double-sided record inside a printer (step S63), and record concentration adjustment will be performed according to it. If it is one side record, it will record by ordinary record concentration (step S64), and record concentration adjustment which will be later mentioned if it is double-sided record is performed, and record concentration is made thin (step S65). Sequential record is performed for every line after that (steps S66 and S67), and if it is (steps S68 and S69) and one side record when record for 1 page is completed, a record medium will be discharged on a paper tray (step S70). If it is double-sided record in step S71, a record medium is discharged in an inhalation location for rear-face record (step S72), the process after step S62 will be discharged after a repeat and double-sided record termination below, and a record medium will be discharged on a paper tray (step S73).

[0038] Next, the adjustment device of said record concentration is explained with reference to drawing 10 thru/or drawing 12.

[0039] (1 of the 2nd example) In drawing 10, when a record factor is transmitted to a double-sided recording information list from a host computer 81, Maine CPU 82 which received the record instruction gives [giving a factice CPU 83 control to which the amount of ink breathed out from a recording head 84 is made fewer than the time of the usual one side record, and] an instruction. The factice CPU 83 who received this instruction changes ink discharge quantity by the recording method. It enables this to change the record concentration at the time of one side record and double-sided record.

[0040] (2 of the 2nd example) By constituting so that an ink jet printer may have the ink (henceforth, dark ink) generally used and thinner ink (henceforth, thin ink), as shown in drawing 11 again. When a record factor is transmitted to a recording information list from a host computer 81, An instruction is given [controlling to record using thin ink 85b, and] when dark ink 85a generally used when Maine CPU 82 which received the record instruction judges it as one side record to a factice CPU 83 is judged to be double-sided record. If it does in this way, it will become possible to change record concentration according to the class of record by work of a factice CPU 83.

[0041] (3 of the 2nd example) Although ordinary record is performed at the time of one side record, record concentration may be adjusted again by constituting so that it may record by thinning out in electric control at the time of double-sided record. It is the means which records by opening a dot space as shown in drawing 12 as "It thins out." In drawing 12, it is a record pattern at the time of recording by the record pattern at the time of recording ordinarily and (B) thinning out (A), and - shows a record dot and O shows the space. The record concentration at the time of double-sided record turns into thin record concentration by constituting so that it may record as mentioned above as compared with the time of one side record. Moreover, if the gap to thin out is changed electrically, it will carry out to the ability also of the thinness of record concentration to carry out adjustable.

[0042] Although the ink jet recording method was used as a record means in [Other Example(s)] and the example mentioned above, it is still more desirable, when growth of the air bubbles produced in ink using film boiling produced in ink with the heat energy which energizes on an electric thermal-conversion object according to a record signal, and is impressed with said electric thermal-conversion object, and contraction constitute so that it may record by breathing out ink from a delivery.

[0043] About the typical configuration and typical principle, what is performed using the fundamental principle currently indicated by the U.S. Pat. No. 4723129 specification and the 4740796 specification, for example is desirable. Although this method is applicable to both the so-called mold on demand and a continuous system. On the electric thermal-conversion object which is especially arranged corresponding to the sheet and liquid route where the liquid (ink) is held in the case of the mold on demand. By impressing at least one driving signal which gives the

rapid temperature rise which supports recording information and exceeds nucleate boiling. Since make an electric thermal-conversion object generate heat energy, the heat operating surface of a recording head is made to produce film boiling and the air bubbles in the liquid corresponding to this driving signal can be formed by one to one as a result, it is effective. A liquid is made to breathe out through the opening for regurgitation by growth of these air bubbles, and contraction, and at least one drop is formed. If this driving signal is made into the shape of a pulse form, since growth contraction of air bubbles will be performed appropriately instantly, the especially excellent regurgitation of a liquid can be attained and it is more desirable.

[0044] As a driving signal of the shape of said pulse form, what is indicated by the U.S. Pat. No. 4463359 specification and the 4345262 specification is suitable. In addition, if the conditions indicated by the U.S. Pat. No. 4313124 specification of invention about the rate of a temperature rise of said heat operating surface are adopted, further excellent record can be performed.

[0045] As a configuration of a recording head, the configuration using the U.S. Pat. No. 4558333 specification and 4459600 specification which indicate the configuration arranged to the field to which the heat operation section other than the combination configuration (a straight line-like liquid flow channel or right angle liquid flow channel) of a delivery which is indicated by each above-mentioned specification, a liquid route, and an electric thermal-conversion object is crooked is also included in this invention.

[0046] Moreover, it is a book to two or more electric thermal-conversion objects also as a configuration based on JP 59-138461A which indicates the configuration whose puncturing which absorbs the pressure wave of JP 59-123670A which indicates the configuration which makes a common slit the regurgitation section of an electric thermal-conversion object, or heat energy is made to correspond to the regurgitation section. Namely, no matter the gestalt of a recording head may be what thing, it is because it can record now efficiently certainly according to this invention.

[0047] Furthermore, this invention is effectively applicable also to the recording head of the full line type which has the length corresponding to the maximum width of the record medium which can record a recording device. As such a recording head, any of the configuration which fills the length with the combination of two or more recording heads, and the configuration as one recording head formed in one are sufficient.

[0048] In addition, the thing of the serial type mentioned above may also use the recording head fixed to carriage, the recording head exchangeable chip type to which the electric connection with the main part of equipment and supply of the ink from the main part of equipment are attained by carriage being equipped, or the recording head of the cartridge type with which the ink tank was formed in the recording head itself in one.

[0049] Moreover, since the effect of ***** can be stabilized further, it is desirable to add the recovery means of a recording head established as a configuration of the recording device of this invention, a preliminary auxiliary means, etc. If these are mentioned concretely, it is effective in order to perform record stabilized by performing the preheating means by the heating elements different from a capping means, a cleaning means, pressurization or a suction means, an electric thermal-conversion type, or this or these combination over a recording head, and reserve regurgitation mode in which the regurgitation different from record is performed.

[0050] Moreover, although only one piece was prepared also about the class thru/or the number of a recording head carried in carriage, for example corresponding to monochromatic ink, corresponding to two or more ink which differs in an others and record color or concentration, more than one may be prepared the number of pieces. That is, although the paddle gap by not the recording mode of only mainstream colors, such as black, but two or more combination which constitutes a recording head in one is sufficient as a recording mode of a recording device, it can apply also to equipment equipped with full color at least one by the double color color of a different color, or color mixture, for example.

[0051] Furthermore, in addition, it is ink solidified less than [a room temperature or it] although ink is explained as a liquid in the example mentioned above, and since the thing softened or liquefied at a room temperature or the thing which carries out temperature control as a temperature control is performed for ink itself within the limits of 30 degrees C or more 70

degrees C or less and it is in a stabilization regurgitation range about the viscosity of ink by the ink-jet recording method is common, ink should just make the shape of liquid at the time of use record signal grant. In addition, it carries out whether the ink which prevents by making the temperature up by heat energy use it positively as energy of the change of state from a solid condition to the liquid condition of ink, or is solidified in the state of neglect for the purpose of antiflashing of ink is used. Anyway, ink liquefies by grant according to the record signal of heat energy. It can apply, also when using the ink of the property which will not be liquefied without heat energy, such as that by which liquefied ink is breathed out, and a thing which it already begins to solidify when reaching a record sheet.

[0052] The ink in such a case is good for a porosity sheet crevice or a through tube which is indicated by JP 54-56847A or JP 60-71260A also as liquefied or a gestalt which counters to an electric thermal-conversion object in the condition of having been held as a solid. The most effective thing performs the film-boiling method mentioned above to each ink mentioned above. [0053] Furthermore, although the image printing terminal of information management systems, such as a computer, carries out and it is used as a gestalt of the ink jet recording device mentioned above, the gestalt of the reproducing unit combined with others, a reader, etc. and the facsimile apparatus which has a transceiver function further may be taken.

[0054] In addition, although the example using the ink jet recording method as a record means mentioned above was explained, it is not necessary to limit the recording method of this invention to an ink jet recording method, and even if they are otherwise recording methods, such as a thermal imprint recording method, and thermal recording, a wire dot recording method, or the other recording method, it can be applied. Moreover, it is not necessary to limit to a serial recording method, and the so-called Rhine recording method may be used.

[0055]

[Effect of the Invention] Since dryness of the ink of the record medium recorded by constituting so that it may carry out adjustable [of the standby time before the after / surface record termination / rear-face recording start at the time of double-sided record] according to the class of record medium can be carried out to regularity as explained above, the dirt in ink etc. can be prevented, and it is not necessary to establish the standby time beyond necessity, and improvement in the throughput in double-sided record can also be realized.

[0056] Moreover, the reverse side projection at the time of double-sided record can be prevented by constituting so that it may carry out adjustable [of the record concentration at the time of one side record, and the record concentration at the time of double-sided record].

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is cross-section configuration explanatory drawing of the printer which is one example of an ink jet recording device.

[Drawing 2] It is strabism explanatory drawing having expanded and shown the discharge roller and the follower roller.

[Drawing 3] It is the important section enlarged view in which it was expanded and shown near the recording system used as the important section of said printer.

[Drawing 4] It is the important section enlarged view in which it was expanded and shown near the recording system used as the important section of said printer.

[Drawing 5] It is the important section enlarged view in which it was expanded and shown near the recording system used as the important section of said printer.

[Drawing 6] It is the important section enlarged view in which it was expanded and shown near the recording system used as the important section of said printer.

[Drawing 7] It is the block diagram showing the electrical circuit of said printer.

[Drawing 8] It is the flow chart which shows the flow of the control action of said printer.

[Drawing 9] It is the flow chart which shows the flow of actuation of the printer concerning the 2nd example of this invention.

[Drawing 10] It is explanatory drawing of the adjustment device of record concentration.

[Drawing 11] It is explanatory drawing of the adjustment device of record concentration.

[Drawing 12] It is explanatory drawing showing the record pattern when adjusting record concentration.

[Description of Notations]

- 1 — Main part of a printer 2 — Platen shaft
- 3 — Platen 4 Five — Feed roller
- 6 — Record medium 7 — The 1st guide plate
- 8 — Carrier 9 — Bail roller
- 10 — The 2nd guide plate 11 — The 3rd guide plate
- 12 — The 1st discharge roller 13 — Axis of rotation
- 14 — Tooth part 15 — Follower roller
- 16 — Shaft 17 — The 2nd discharge roller
- 18 — Axis of rotation 18a — Bearing
- 19 — Tooth part 20 — Paper tray
- 21 — Stopper 22 — Follower roller
- 23 — Shaft 24 — Presser-foot board
- 25 — It falls and is a prevention board.
- 30 — CPU 31 — ROM
- 32 — RAM 33 — Data receive section
- 34 — Record-medium class distinction section 35 — Standby-time timer section
- 36 — Recording head migration mechanical component 37 — Record-medium conveyance mechanical component
- 38 — Recording head record mechanical component 39 — Sensor section

40 — Bus
81 — Host computer 82 — Maine CPU
83 — Factice CPU 84 — Recording head
85a — Dark ink 85b — Thin ink

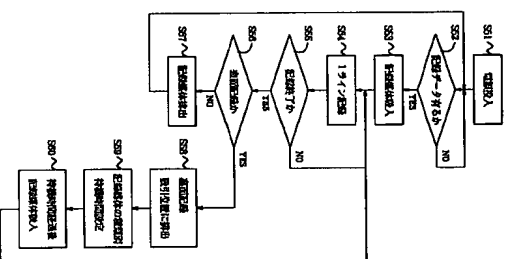
[Translation done.]

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(57) 【要約】
【目的】 画面記録機構を有するインクジェット記録装置において、インクによる汚れや裏写りを防止すること。
【構成】 画面記録時における記録媒体の表面記録終了後裏面印刷開始前の特検時間を前記記録媒体の種類に応じて可変するよう構成する。
【効果】 上記構成により、記録媒体の種類にかかわらずインクの乾きを一定にできるため、インクによる汚れや裏写りを防止することができる。



【特許請求の範囲】

・【請求項1】 信号に応じてインクを吐出して記録を行うインクジェット記録手段と、

片面及び両面記録時に記録媒体の搬送を行う搬送手段

両面記録時における記録媒体の表面記録終了後裏面記録開始前の待機時間を前記記録媒体の種類に応じて可変する手段と、

を有することを特徴としたインクジェット記録装置。
【請求項2】 信号に応じてインクを吐出して記録を行
うインクジェット記録手段と、

片面及び画面記録時に記録媒体の搬送を行う搬送手段と、

片面記録時の記録速度と両面記録時の記録速度とを可変する手段と、
片面記録時を特徴としたインジケータ記録装置。

【請求項3】 前記インクジェット記録手段は、インク吐出用の熱エネルギーを発生するための電気熱変換体を備えていることを特徴とする請求項1又は請求項2に記載のインクジェット記録装置。

【請求項4】 前記インクジェット記録手段は、前記電

ンクに生ずる吸沸騰を利用して吐出口よりインクを吐出させることを特徴とする請求項3に記載のインクジェットの配装装置。

【発明の詳細な説明】
【0001】

【産業上の利用分野】本発明は、信号に応じてインクを吐出して記録を行うインクジェット記録装置に関し、特に画面印刷機能を有するインクジェット記録装置に関する。

[0002]

【従来の技術】 フリントガラスミリなどの記録媒体には、記録信号に基づいて記録ヘッドのドット形成手段を駆動することにより、前記信号（画像情報）に対応するドットパターンを記録媒体（通常は記録シート）上に形成していくように構成されている。

【0003】前記記録装置の一形式としてインクジェット方式を用いた記録装置があるが、これは記録ヘッドから前記信号に応じてインク滴を飛翔させ、記録シートやプラスチック薄板等の記録媒体に前記インク滴を付着させて画像を形成するものである。

【0004】従来、前記インジェクション記録装置において画面記録機能を有するものは、片面記録時と両面記録時の記録濃度を変化させることなく記録が行われていた。

【0005】また前記インクジェット配線装置は、配線媒体にインク滴を吐出させて文字又は画像を形成するもの質上、配線直後の配線媒体表面のインクが乾燥しておらず、表面配線に移る前に一定の待機時間を設けること

(2)

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よって前記イソクによる汚れを防止するようにして
いた。

【0006】

【説明が際立ってしまう問題】 しかしながら、上記仮定来例のように表面記録に移る前に一定の待機時間を設けることで、記録媒体の種類等によりインクが乾燥するまでの時間に差異が生じるため、記録媒体表面のインクが乾燥し、インクが劣化して表面記録に移ってしまう可能性があるという問題が生じ、そのインク劣化等が発生するという問題があった。また、全ての記録媒体に対応するなどの充分な待機時間を設けるとスループットに影響し実用性ではな

【0000】また片面記録時と両面記録時の記録媒体が同じであるとき、記録媒体の種類によって両面記録時に記録媒体裏面と面が記録媒体表面に達してきるといふ、所謂裏送りが起こり得る可能性があり、その場合記録された面が一部取り壊くなるという問題があった。【0008】そこで、本発明の目的は前記課題を解決するものである、インボにその汚れや裏面を防止したインボジェットと記録装置を提供せんとするものである。

【00009】
 【課題を解決するための手段】前記目的を達成するための本発明のインフラジェント記録装置の構成は、併行してイベントを発生して記録を行うインフラジェント記録手段と、片面及び両面記録時に記録媒体の搬送を行う搬送手段と、両面記録時に記録媒体の裏面記録終了後裏面記録開始時の外周検出を前記記録媒体の直線におて可変する手段と、を有することを特徴としている。

【0010】前記目的を達成するための本発明のインクジェット記録装置の構成は、信号に応じてインクを吐出して記録を行うインクジェット記録手段と、片面及び両面記録時に記録媒体の搬送を行う搬送手段と、片面記録時の記録速度と両面記録時の記録速度とを可変する手段と、を有することを特徴としている。

【作用】前記構成に係るインクジェット記録装置においては、裏面記録に移る前の待機時間を記録媒体の種類別に可変することにより、インクによる汚れや裏写りを低くするようにしたものである。

【0012】前記構成に係るインタジェクツト記録装置においては、片面記録時の記録速度と両面記録時の記録速度とを可変することにより、インタの裏写りを防ぐようにしたものである。

[0013]

【実施例】
 【第1実施例】次に本発明の第1実施例に係るインクジェット記録装置について図面を参照して説明する。

【0014】まずインクジェット記録装置の全体構成について概略説明する。図1は本発明に係るインクジェット記録装置の一実施例であるブリダの断面構成説明図

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ツフS72)、以下ステップS62以降の処理を繰り返す、
画面記録終了後、記録媒体をベーパーレイト上に排出す
る(ステップS73)。

【0038】次に、前記記録速度の調整機構について図
10乃至図12を参照して説明する。

【0039】(第2実施例の1) 図10において、ホスト
コンピュータ81から画面記録情報並びに記録要因が送信
された場合、記録命令を受信したメインCPU82がサブ
CPU83に記録ヘッド84から吐出されるインク量を通常
の片面記録時よりも少なくする制御を行うよう命令を与
える。この命令を受け取ったサブCPU83は記録方式に
よりインク吐出量を変える、これにより片面記録時と両
面記録時の記録速度を変えることが可能となる。

【0040】(第2実施例の2) また図11に示すよう
に、インクジェットヘッドが一般に使用するインク
(以下、滴インク) と稀めのインク (以下、薄インク)
とを併用して構成することにより、ホストコンピュ
ータ81から記録情報並びに記録要因が送信された場合、記
録命令を受信したメインCPU82がサブCPU83に片面
記録と判断した場合は一般に使用する滴インク85aを、
両面記録と判断した場合は薄インク85bを使用して記録
を行うように制御するよう命令を与える、このように
すればサブCPU83の働きにより記録の種類により記録
速度を変えることが可能となる。

【0041】(第2実施例の3) また、片面記録時にお
いては普通の記録を行うが、両面記録時には電気
的制御で間引いて記録を行うように構成することによ
って記録速度の調整を行っても良い、【図10】とは図12
に示すようにドット間隔をあけて記録を行う手段であ
る。図12において、(A) は普通に記録を行った場合の記
録パターン、(B) は間引いて記録を行った場合の記
録パターンで、●は記録ドット、○はスペースを示して
いる。上述のように記録を行うよう構成することによ
って両面記録時の記録速度は片面記録時と比較すると薄い
記録速度となる。また間引く間隔を電気的に変化させれ
ば記録速度の薄さも可変することが可能となる。

【0042】(他の実施例) また前述した実施例では配
線手段としてインクジェット記録方式を用いたが、記録
信号に応じて電気熱変換体に通電し、前記電気熱変換体
によって加熱される熱エネルギーにより、インクに生ず
る蒸気膜を利用してインクに生ずる気泡の成長、収縮に
より、インクを吐出口より吐出して記録を行うように構
成すると更に好ましい。

【0043】その代わりの構成や原理については、例え
ば米国特許第4723129号明細書、同第474036号明細書
に開示されている基本的な原理を用いて行うものが好ま
しい。この方式は所謂オンデマンド型、コンティニユア
ス型の何れにも適用可能であるが、特にオンデマンド型
の場合には、液体(インク) が保持されているシートや
液路に対応して配置されている電気熱変換体に、記録情

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報に対応して後沸騰を越える急激な温度上昇を与え
る、少なくとも1つの駆動信号を印加することによって、
電気熱変換体に熱エネルギーを発生せしめ、記録ヘッド
の熱作用面に膜沸騰を生じさせて、結果的にこの駆動信
号に一対一で対応した液体内の気泡を形成出来るので有
効である。この気泡の成長、収縮により吐出開口を介
して液体を吐出させて、少なくとも1つの滴を形成す
る。この駆動信号をパルス形状とすると、即時適切に気
泡の成長収縮が行われるので、特に変れる液体の吐出が
達成出来、より好ましい。

【0044】前記パルス形状の駆動信号としては、米国
特許第446339号明細書、同第4348262号明細書に記載
されているようなものを通じている。尚、前記熱作用面
の温度上昇率に関する第1の米国特許第431312号明細
書に記載されている条件を採用すると、更に優れた記録
を行うことが出来る。

【0045】記録ヘッドの構成としては、前述の各明細
書に開示されているような吐出口、液路、電気熱変換体
の組合せ構成(直線状液路流路又は直角液流路)の他に熱
作用部が屈曲する領域に配置されている構成を開示する
米国特許第4585833号明細書、同第4459600号明細書
を用いた構成も本発明に含まれるものである。

【0046】また複数の電気熱変換体に対して、共通す
るスリットを電気熱変換体の吐出部とする構成を開示す
る特開昭59-12367号公報や熱エネルギーの圧力波を吸
収する開口を吐出部に形成させる構成を開示する特開昭
59-138461号公報に基づいた構成としても本発明の効果
は有効である。即ち、記録ヘッドの形骸がどのような
ものであっても、本発明によれば記録を確実に効率良く行
うことが出来るようになるからである。

【0047】更に、記録装置が記録出来る記録媒体の最
大幅に対応した長さを有するフルインクタイプの記録ヘ
ッドに対しても本発明は有効に適用出来る。そのような
記録ヘッドとしては、複製記録ヘッドの形成された1個
の記録ヘッドとして形成のいずれでも良い。

【0048】加えて、前述したリアルタイムのものでも
も、キャリッジに固定された記録ヘッド、或いはキャリ
ッジに装着されることと装置本体との電気的な接続や装
置本体からのインクの供給が可能になる交換自在のチャ
プタイプの記録ヘッド、或いは記録ヘッド自体に一体的
にインクタンクが設けられたカートリッジタイプの記録
ヘッドを用いても良い。

【0049】また本発明の記録装置の構成として設けら
れる、記録ヘッドの回復手段、予備的な補助手段等を付
加すること本発明をのめを一意安定出来るの好まし
いものである。これらを具体的に挙げれば、記録ヘッ
ドに対してのキャッピング手段、クリーニング手段、加
圧或いは吸引手段、電気熱変換タイプ或いはこれは別
の加熱素子或いはこれらの組合せによる予備加熱手段、

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記録とは別の吐出を行う予備吐出モードを行うことも安
定した記録を行うために有効である。

【0050】またキャリッジに搭載される記録ヘッドの
種類ないし個数についても、例えば単色のインクに対応
して1個のみが設けられたもの他、記録色や濃度を異
にして複数のインクに対して複数個数設けられるもの
であって良い。即ち、例えば記録装置の記録モードとし
ては黒色等の主流色のみの記録モードでなく、記録ヘッ
ドを一体的に構成する複数個の組合せによるかいずれ
も良いが、異なる色の複色カラー、または複色によるフ
ルカラーの少なくとも一つを備えた装置にも適用し得
る。

【0051】更に加えて、前述した実施例に於いてはイ
ンクを液体として説明しているが、室温やそれ以下で固
化するインクであって、室温で軟化若しくは液化するも
の、或いはインクジェット記録方式ではインク自体を30
℃以上70℃以下の範囲内で温度調整を行ってインクの粘
性を安定吐出範囲にあるように温度制御するものが一
般的であるから、使用記録信号付与時にインクが液体をな
すものであれば良い。加えて、積極的に熱エネルギーに
よる昇温をインクの固形状態から液体状態への状態変化
のエネルギーとして使用せしめることで防止するが、ま
たはインクの蒸発防止を目的として放熱状態で固化する
インクを用いるかして、いずれにしても熱エネルギーの
記録信号に応じた付与によってインクが液化し、液体イ
ンクが吐出されるものや、記録シートに到達する時点で
はすでに固化し始めるもの等のような、熱エネルギーに
よって初めて液化する性質のインクを使用する場合も適
用可能である。

【0052】このような場合のインクは、特開昭54-568
47号公報或いは特開昭60-71260号公報に記載されるよう
な、多孔質シート内部または貫通孔に液状又は固形物と
して保持された状態で、電気熱変換体に対して対向する
ような形態としても良い。上述した各インクに対して最
も有効なものは、前述した膜沸騰方式を実行するもので
ある。

【0053】更に、前述したインクジェット記録装置の
形態としては、コンピュータ等の情報処理機器の画像出
力端末として用いられるもの他、リリグ等と組み合わ
せた複写装置、更には送受信機能を有するフロッピー
装置の形態をとるもの等であっても良い。

【0054】尚、前述した記録手段としてインクジェ
ット記録方式を用いた例を説明したが、本発明の記録方
式はインクジェット記録方式に限定する必要はなく、他
にも熱転写記録方式や感熱記録方式、更にはフライポ
ット記録方式等の記録方式、或いはそれ以外の記録方式で
あっても適用し得る。またリアルタイム記録方式に限定する
必要もなく、所謂リアルタイム記録方式を用いても良い。

【0055】
【発明の効果】以上説明したように、両面記録時にお

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る表面記録終了後裏面記録開始前の待機時間を記録媒体
の運動に応じて可変するよう構成することにより、記録
される記録媒体のインクの動きを一定にすることができ
るため、インク等による汚れを防止でき、また必要以上
の待機時間を要する必要もなく、両面記録におけるスル
ープットの向上も実現できる。

【0056】また、片面記録時の記録速度と両面記録時
の記録速度とを可変するよう構成することにより、両面
記録時の要する時間を短くすることができる。

【図面の簡単な説明】
【図1】 インクジェット記録装置の一実施例であるフリ
ングの断面構成説明図である。

【図2】 排出ローラ及び送動ローラを拡大して示した斜
視説明図である。

【図3】 前記フリングの要部となる記録系近傍を拡大し
て示した要部拡大図である。

【図4】 前記フリングの要部となる記録系近傍を拡大し
て示した要部拡大図である。

【図5】 前記フリングの要部となる記録系近傍を拡大し
て示した要部拡大図である。

【図6】 前記フリングの要部となる記録系近傍を拡大し
て示した要部拡大図である。

【図7】 前記フリングの電気回路を示すブロック図であ
る。

【図8】 前記フリングの制御動作の流れを示すフローチ
ャートである。

【図9】 本発明の第2実施例に係るフリングの動作の流
れを示すフローチャートである。

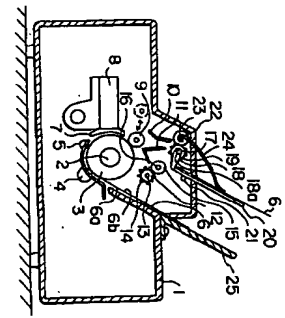
【図11】 記録速度の調整機構の説明図である。

【図12】 記録速度の調整を行った時の記録パターンを
示す説明図である。

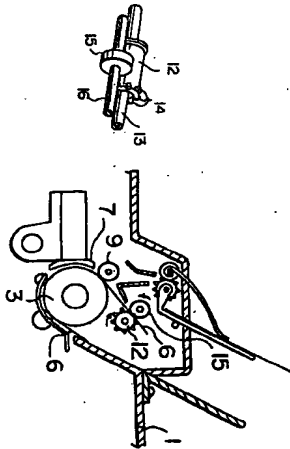
- 【符号の説明】
- | | |
|------------|----------|
| 1…フリング本体 | 2…フロッピー軸 |
| 3…フロッピー | 4, 5…フレイ |
| 6…記録媒体 | 7…第1ガイド |
| 8…キャリッジ | 9…ベンドローラ |
| 10…第2ガイド板 | 11…第3ガイド |
| 12…第1排出ローラ | 13…回転軸 |
| 14…歯部 | 15…送動ローラ |
| 16…軸 | 17…第2排出ロ |
| 18…回転軸 | 18a…軸受 |
| 19…歯部 | 20…ベーパー |
| 21…スロット | 22…送動ローラ |

- | | | | |
|-----------------|-----------------|----------------|---------------|
| 23...軸 | 24...押さえ板 | 送膜部 | 39...センサ部 |
| 25...倒れ防止板 | 38...記録ヘッド移動駆動部 | | |
| 30...CPU | 31...ROM | 40...バス | 82...マイコンCPU |
| 32...RAM | 33...データ受信部 | 81...ホストコンピュータ | 85 a...漏えいソノク |
| | | U | |
| 34...記録媒体種類判別部 | 35...待機時間タイマ一部 | 83...サブCPU | 84...記録ヘッド |
| 36...記録ヘッド移動駆動部 | | 85 b...漏えいソノク | |
| | | 37...記録媒体搬 | |

【図1】

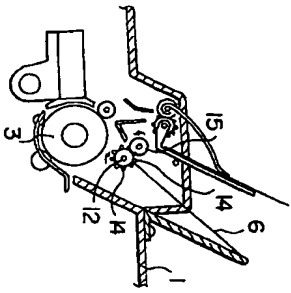


【図2】

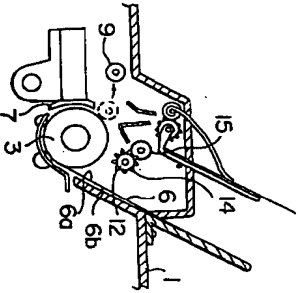


【図3】

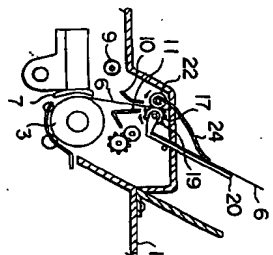
【図4】



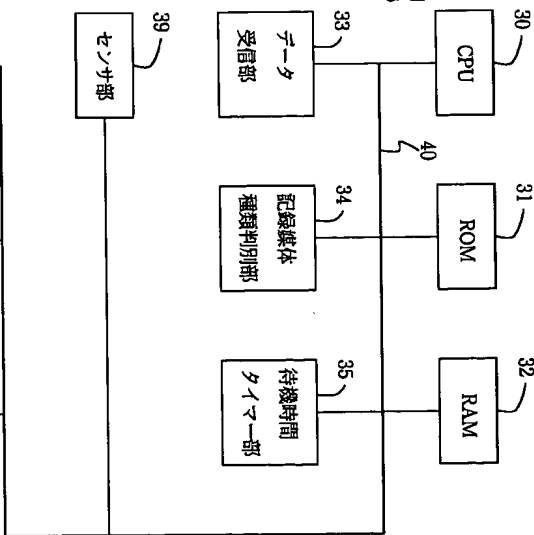
【図5】



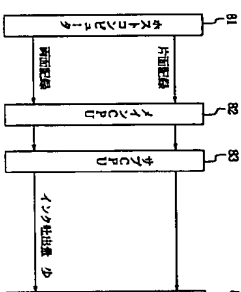
【図6】



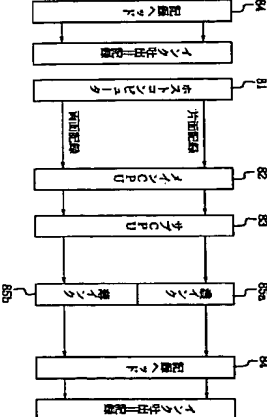
【図7】



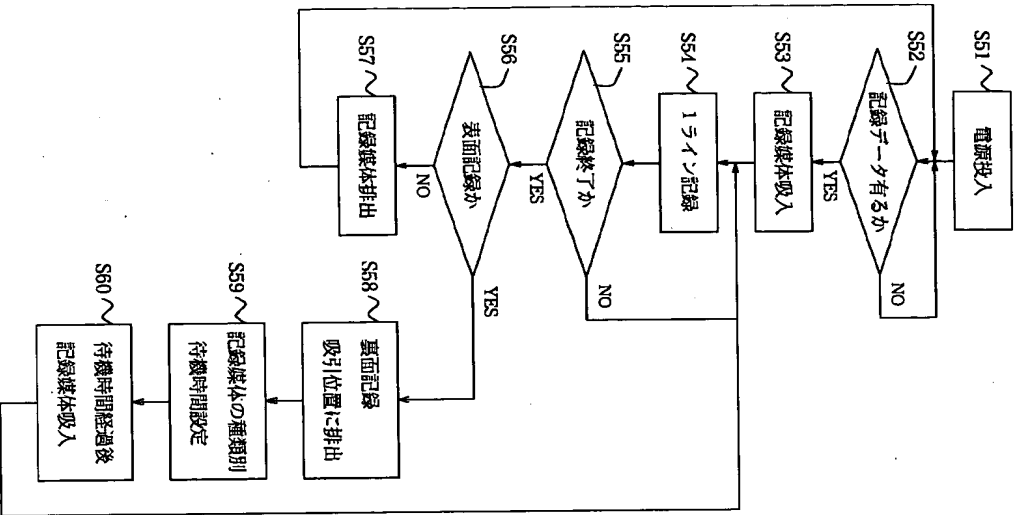
【図10】



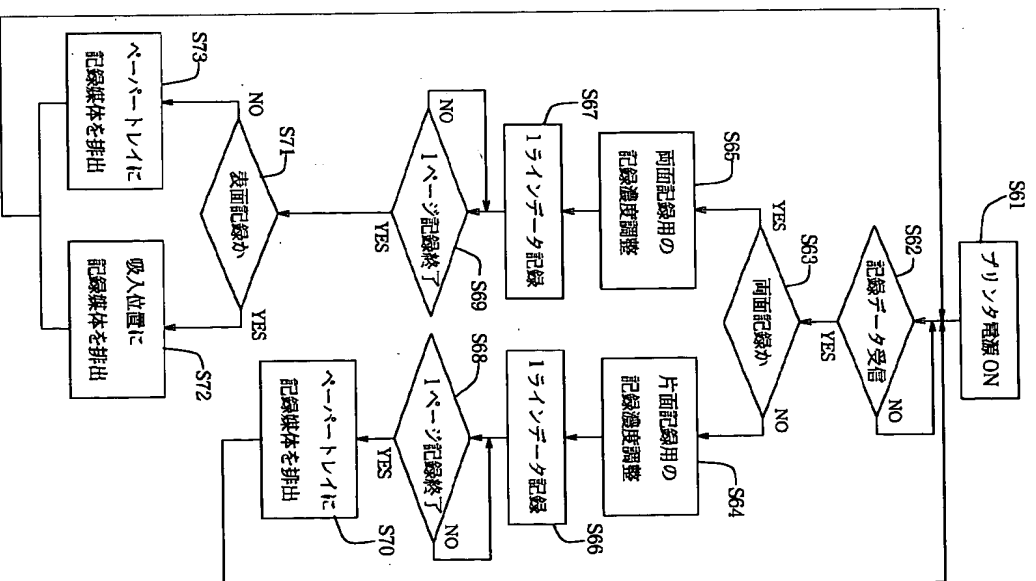
【図11】



【図8】



【図9】

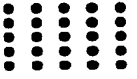


(11)

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【圖 12】

(a)



(b)

